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Running Head: Social support and cardiovascular reactivity in older adults

PERCEIVED SOCIAL SUPPORT PREDICTS LOWER CARDIOVASCULAR REACTIVITY TO STRESS IN OLDER ADULTS

Siobhán Howard[1]*, Ann-Marie Creaven[2], Brian M. Hughes[3], Éanna D. O'Leary[4], and Jack E. James[5]

[1]Mary Immaculate College, University of Limerick, Ireland

[2]University of Limerick, Ireland

[3]National University of Ireland, Galway, Ireland

[4]Institute of Psychiatry, Psychology, & Neuroscience, King's College London, UK

[5] Reykjavik University, Iceland

*Corresponding author
Siobhán Howard
Department of Psychology
Mary Immaculate College, University of Limerick
South Circular Road
Limerick
Ireland
Phone: +35361204533
Email: siobhan.howard@mic.ul.ie

Highlights:

- Perceived quality of social support is associated with lower blood pressure reactivity to laboratory stress in older adults
- Perceived social support is not associated with ambulatory blood pressure in daily life in older adults
- This paper extends the research on social support in the laboratory and in daily life to a sample of older adults
- Challenges for future research are highlighted

ABSTRACT

The benefits of perceived social support for physical and psychological health are well-established. However, little research has explored associations between perceived social support and cardiovascular reactivity in older adults. This exploratory study recruited a sample of older adults (M_{age} = 69 years, *SD* = 5.62) and examined quality and quantity of perceived social support as predictors of cardiovascular reactivity to laboratory-based stress (*N* = 39 participants) and ambulatory cardiovascular activity in everyday life (*n* = 28). The results suggest that quality, but not quantity, of perceived social support predicts reduced blood pressure reactivity to stress in the laboratory. Although quality of support was not associated with ambulatory blood pressure, results suggest that quantity of daily social support may be associated with higher ambulatory heart rate, but not with social contact during measurement. This preliminary study extends prior work on social support and cardiovascular function to a group of older adults in both laboratory and field settings. Challenges for much-needed future research in this area are discussed.

Keywords: Perceived social support, cardiovascular reactivity, ambulatory blood pressure, social contact

INTRODUCTION

The benefits of social support networks in fostering health-supportive behaviours and increased longevity have been promoted since early studies identifying an inverse association between social support and mortality (e.g., Berkman & Syme, 1979). A meta-analysis concluded that social support was comparable to well-established risk factors, such as smoking and alcohol consumption, in predicting risk for mortality (Holt-Lunstad, Smith, & Layton, 2010). Several behavioural and biological mechanisms have been proposed to mediate the link between mortality risk and social support. Of these, the *stress-buffering hypothesis* has been the most extensively examined, wherein availability of social support as a coping resource attenuates cardiovascular response to stressors (Thorsteinsson & James, 1999) leading to lower levels of cardiovascular disease risk (Lovallo, 2005).

Within the epidemiological research, an important distinction has been made between *perceived* social support and *received* social support (Uchino, Carlisle, Birmingham, & Vaughn, 2011). Perceived social support, typically assessed using validated psychometric inventories, is a measure of the social support a person believes would be available to them during periods of stressful life challenges. Received support is the actual support received during such periods. These two dimensions are not interchangeable, with perceived social support demonstrating more consistent associations with reduced cardiovascular disease development (Orth-Gomér, Rosengren, & Wilhelmsen, 1993). This may be because the perception that social support is available reduces stress by encouraging individuals to believe that they have more coping resources available to them. In contrast, receiving support may highlight the recipient's need and therefore threaten self-esteem and possibly *exacerbate* stress (e.g., Uehara, 1995). Alternatively, variation in methodological approaches may be responsible for apparent differences in the influence of perceived and received social support on health outcomes. Studies examining perceived social support tend to focus on survey methods, while those examining received social support use laboratory-based experimental designs.

In general, laboratory studies more frequently focus on experimental manipulations of received social support in the laboratory rather than examination of perceived social support (e.g., Kamarck, Manuck, & Jennings, 1990). These studies tend to provide evidence for the stress-buffering hypothesis by reporting reduced cardiovascular reactivity when a supportive "other" is present (see Uchino et al. [2011] for a discussion of factors that can moderate this association). Consistent with the stress-buffering hypothesis, Lee et al. (2012) found that psychometrically assessed social support was associated with reduced heart rate (HR) reactivity, while Schwerdtfeger and Schlagert (2011) reported lower HR reactivity in those with high perceived social support during an enacted support condition in a sample of young adults. Additionally, Clark (2003) reported that high perceived social support was associated with lower blood pressure reactivity. When both experimental manipulations of received social support and self-reported perceived social support in young adults is examined, perceived social support moderates the impact of received social support on cardiovascular reactivity (O'Donovan & Hughes, 2008).

Taken together, these studies suggest that perceived social support is a predictor of attenuated cardiovascular reactivity to acute stress in the laboratory. However, an important delineation can be made between measures of *quality* of social support and measures of *quantity*. Measures of quantity refer to the amount of social support a person perceives is available to them (usually during periods of stress), while measures of quality assess how the person perceives the quality of support available to them. Hughes and Howard (2009) reported that just quality, and not quantity, of social support was associated with lower resting blood pressure levels in a sample of healthy adults, and similar findings have been reported by Uchino, Kent de Grey, and Cronan (2016).

As well as predominantly focusing on manipulations of received social support, laboratory studies also tend to use younger participants in their analyses (see Thorsteinsson & James, 1999). However, life-span variations in the association between social support and cardiovascular reactivity deserve consideration. Firstly, compared with younger adults, older adults demonstrate a distinct psychophysiological stress profile in the laboratory, displaying reduced HR reactivity (Kudielka, Buske-Kirschbaum, Hellhammer, & Kirschbaum, 2004a) and variation in HPA axis reactivity (Kudielka, Buske-Kirschbaum, Hellhammer, & Kirschbaum, 2004b). Secondly, older adults could be more vulnerable to reductions in social networks (e.g., through bereavement or retirement). Furthermore, socioemotional selectivity theory (Carstensen, Isaacowitz, & Charles, 1999) hypothesises that older adults purposefully narrow their social networks in order to focus on the relationships that are most rewarding and supportive. Therefore, empirical studies examining the influence of social support on cardiovascular stress reactivity in younger samples may not be generalizable to older adult populations. Extending empirical studies of the stress-buffering hypothesis to older adults is therefore important to examine the potential health benefits of social support in this specific cohort.

In addition, few studies have examined if perceived social support shows reliable associations with ambulatory blood pressure (ABP) monitoring. Previously, Steptoe (2000) reported that those with higher perceived social support had lower stress-related increases in ABP, using a global social support measure. In a study of heterosexual couples, social support buffered the link between momentary stress and ambulatory systolic blood pressure (SBP) and diastolic blood pressure (DBP; Bowen et al., 2014). While evidence from laboratory and field studies suggests that social support is reliably associated with cardiovascular reactivity, to date, no study has examined the association between perceived social support and cardiovascular function in both the laboratory and the field in the same sample. Furthermore, despite differences in social support networks and emphasis (quantity versus quality) between younger and older samples, few studies have used older adult samples in their analyses.

Therefore, the present study was formulated to take account of the fact that despite important differences in features of social support networks between older and younger adults, older adults have been infrequently chosen for study in laboratory-based research examining social support. More specifically, the present study aimed to investigate links between perceived social support and both laboratory-based cardiovascular reactions to stress and ambulatory cardiovascular activity in everyday life in a sample of older adults. Based on prior work demonstrating the cardiovascular benefits of perceived social support, we hypothesized that social support in a sample of older adults would be associated with reduced cardiovascular reactivity in the laboratory and lower ambulatory cardiovascular activity.

METHOD: STUDY 1

Design

Study 1 employed a repeated-measures laboratory-based design in which phase was the within-subjects factor, with two levels comprised of baseline and task. Social support scores as assessed by questionnaire served as a covariate. SBP, DBP, and HR were the dependent variables.

Participants

Thirty-nine participants (10 males and 29 females) were recruited for the present study. All participants had the ability and means to travel to the research laboratory and were aged 60 years or over. Consequently, the sample was self-selecting to the extent that participants were recruited through advertisement in local papers, radio, and via online media. Participants, who ranged in age from 60 years to 83 years (M = 69, SD = 5.62), were reimbursed €20 to cover travel expenses to and from the laboratory. All participants provided written informed consent and all procedures were approved by the Institutional Ethical Review Board.

Materials

Cardiovascular Assessment

Cardiovascular measures in the laboratory (i.e., SBP, DBP, and HR) were assessed using the Finometer continuous hemodynamic monitor (Finapres Medical Systems BV, BT Arnhem, The Netherlands). Finometer measurement is based on the volume-clamp method first developed by Peňaz (1973). The Finometer has been shown to accurately assess absolute blood pressure (Schutte, Huisman, Van Rooyen, Oosthuizen, & Jerling, 2003) and meets the validation criteria of the Association for the Advancement of Medical Instrumentation.

Social Support Assessment

Social support was assessed using the Short Form Social Support Questionnaire (SSQ6; Sarason, Shearin, Pierce, & Sarason, 1987). The SSQ6 consists of six questions to which the person responds by indicating a maximum of nine people in their life on whom they rely for this kind of support. For example, the first question asks participants “Whom can you really count on to distract from your worries when you feel under stress?” Each question is followed by a rating scale from 1 to 6 indicating how satisfied the person is with the support received. Therefore, the scale yields a measure of both the quantity of perceived support in the person's life and the quality of perceived support. Possible scores for quantity range from 0 to 54 and possible scores for quality range from 6 to 36. Sarason et al. reported good psychometric properties, including high internal consistency for both the quantity and quality scales of the SSQ6 (α = .90 to .93). In the present study, Cronbach's alpha for the quantity subscale was .81 and for the quality subscale was .79, indicating satisfactory internal consistency. The correlation between the quantity and quality subscales of the SSQ6 is reported to be modest (r = +.37 to +.58) suggesting that the two components measure separate constructs. The correlation between both subscales was +.32 in the present study. To increase participant understanding of the SSQ6 items, reduce participant burden, and to establish a rapport prior to recording baseline measures, the SSQ6 was administered verbally to participants and responses noted by the investigator. Total scores were computed separately for each of the two subscales.

Stressor Task

The laboratory stressor was a computer-presented vigilance task, which has previously been reported to be both stressful and difficult (Smit & Rogers, 2000), and elicits a cardiovascular response (James & Gregg, 2004). Single digits were presented on-screen at a rate of three digits per second. Participants were required to respond as soon as they detected a sequence of three odd or three even numbers appearing consecutively on-screen. Participants responded to the target sequences using the computer mouse. Time taken to react was recorded as an indicator of performance. The stressor task lasted 10 minutes. Comparison of measures of self-reported stress taken before and after the task confirmed that the task was effective in inducing feelings of stress (p = .029).

Procedure

Participants were asked to avoid consumption of alcohol for 12 hours prior to participation and to avoid intake of caffeine for 2 hours. On arrival at the laboratory, participants were seated at a desktop computer and were attached to the Finometer, but initially without measurements being taken. Participants were then interviewed for approximately 20 minutes, including questions about general health (self-rating on a 10-point Likert scale), smoking, medication use, and family history of heart disease. The SSQ6 was also completed during the interview, with the researcher verbally delivering items and noting participant responses. This allowed a period of acclimatization to the laboratory environment before the beginning of laboratory measurements. Participants were informed that there would be little interaction and no conversation with the researcher during the procedure. Finometer measurements were taken continuously during baseline and during the vigilance task, both of which were 10 minutes. During the formal baseline period participants were provided with reading material in order to avoid rumination-related pressor effects (Ottaviani, Shapiro, & Fitzgerald, 2011). Finally, participants were given a computer-presented countdown to the task. Following the vigilance task, a second investigator introduced participants to the ambulatory study (described below).

RESULTS: STUDY 1

Sample Description

Of the 39 adults, only one reported being a smoker. Thirty-four indicated that they were currently taking prescription medication, with 20 of these indicating that their medication use was for hypertension. The majority of participants (*n* = 32) reported some history of heart disease, including personal history (*n* = 5), family history (*n* = 11), or both (*n* = 16). Mean body mass index (BMI) was 28.2kg/m^2 (*SD* = 4.2kg/m^2). For self-reported health, measured as 1 (poor) to 10 (excellent), the lowest rating was 4 (n = 1) and the highest was 10 (n = 5). The modal score was 8.0 (n = 19), with a mean self-reported health rating of 7.8 (SD = 1.4). Thus, aside from BMI in the overweight range, the sample recruited was of good health, with frequency of medication use for hypertension in line with expectations for this cohort (Gu, Burt, Dillon, & Yoon, 2012).

Preliminary Analyses

Mean cardiovascular levels (SBP, DBP, and HR) during the baseline and task phases of the laboratory procedure were computed. Social support scores were treated as continuous variables, with social support quantity ranging from 6 to 14 (M = 10.54, SD = 2.51) and social support quality ranging from 7 to 54 (M = 27.45, SD = 11.01). Data were analysed using SPSS Version 23.

Confirmation of Reactivity

Table 1 shows the means and standard deviations for each phase of the study as a function of high and low levels of perceived social support quality. A series of paired-samples t-tests confirmed that task levels of SBP, $t(38) = 8.10$, $p < .001$, DBP, $t(38) = 6.84$, $p < .001$, and HR, $t(38) = 3.27$, $p = .002$, were higher than baseline levels.

Insert Table 1 here

Social Support and Cardiovascular Reactivity

To determine if self-reported social support levels predicted level of cardiovascular response during the laboratory tasks, separate one-way repeated-measures ANCOVAs were conducted for mean SBP, DBP, and HR. The within-subjects factor was phase with two levels representing baseline and task; social support was entered as a covariate. The influence of social support on cardiovascular reactivity was confirmed if the homogeneity of regression slopes assumption was violated; that is, where a significant phase × social support interaction was identified. Phase × social support interaction effects were further examined through simple correlations between reactivity and social support. Reactivity scores were computed by subtracting baseline values from task values, creating a d-score. Reactivity scores were only used to confirm the nature of interaction effects identified in the factorial ANCOVA analyses.

Quality of social support

For SBP, a main effect for phase confirmed that measures during task were higher than during baseline, $F(1,37) = 11.16$, $p = .002$, partial $\eta^2 = .23$. A significant phase × social support quality interaction was observed, $F(1,37) = 4.27$, $p = .046$, partial $\eta^2 = .10$ on SBP. Pearson's r confirmed that there was an inverse relationship between social support quality and SBP reactivity, $r = -.32$, $p = .046$, indicating that higher perceived social support was associated with lower SBP reactivity to the stressor.

Similarly, for DBP, a main effect for phase, $F(1,37) = 10.77$, $p = .002$, partial $\eta^2 = .23$, confirmed that task levels were higher than baseline levels. As with SBP, a significant phase × social support quality interaction was observed for DBP, $F(1, 37) = 4.86$, $p = .034$, partial $\eta^2 = .12$. Pearson's r confirmed that there was an inverse relationship between perceived social support quality and DBP reactivity, $r = -.34$, $p = .034$.

For HR, there was no main effect for phase ($p = .296$) and no phase × social support quality interaction ($p = .573$).

Quantity of social support

As with quality of social support, there were main effects for phase for both SBP (p = .003) and DBP (p = .005), but none on HR (p = .160). Unlike that observed on social support quality, there was no phase × social support quantity interactions for either SBP, $F(1,36) = .051$, $p = .823$, or DBP, $F(1,36) = .27$, $p = .604$. Similarly, there was no phase × social support quantity interaction for HR, $F(1, 36) = .053$, $p = .819$.

Social Support and Cardiovascular Recovery

Paired samples *t*-tests confirmed that measures of SBP, $t(38) = 4.54$, $p < .001$, DBP, $t(38) = 6.06$, $p < .001$, and HR, $t(38) = 2.61$, $p = .013$, did not return to baseline levels during the recovery phase of the study. Repeated-measures ANCOVA, with baseline and recovery levels as within-subjects factor and social support entered as covariate, confirmed that quantity of social support did not influence this failure to return to baseline levels (all *p*s > .45). Similarly, analyses confirmed that quality of social support did not influence this failure to return to baseline levels (all *p*s > .20).

METHOD: STUDY 2

Design

Study 2 incorporated repeated measures of cardiovascular activity and self-report of social contact and activity level during assessment. The dependent variables were SBP, DBP, and HR measured throughout the day, and mean activity level was used as a covariate (e.g., Kamarck et al., 2002).

Participants

While all participants who took part in Study 1 agreed to participate in Study 2, complete cardiovascular and activity diary data were returned by only 28 of the 39 participants. For n = 11, activity diaries were not completed; for n = 4 (of these 11), the ABP monitor returned less than 1 hour of monitoring. These participants ranged in age from 60 years to 82 years (M = 69.36, SD = 5.43). Laboratory resting cardiovascular measurements, age, height, weight, and gender did not differ between the 28 participants in Study 2 and the 11 individuals from Study 1 who did not participate in Study 2 (all ps > .14).

Materials

Cardiovascular Assessment

Ambulatory cardiovascular measures were recorded by the Oscar 2 ambulatory blood pressure monitor (SunTech Medical, Oxfordshire, UK). This assesses blood pressure and HR through a standard arm cuff and a small hardware component that can be worn on a belt and is easily hidden under clothing. The monitor was programmed to record a measurement once every 20 minutes (plus or minus five minutes to ensure participants could not predict the precise moment of the next blood pressure measurement). Participants were instructed to keep their arm still when they felt the cuff inflating in order to obtain a valid measurement.

Activity Diary

Participants were asked to complete a short hardcopy activity diary as soon as possible after each cuff inflation and deflation (a blood pressure measurement cycle), indicating whether at the time inflation commenced they were 1) reclining, 2) sitting, 3) standing, 4) walking. This measurement allowed quick and easy recording of the activity level of participants during measurement for use as a control variable.

Participants were also asked to rate the level of social contact they had during the measurement on a 4-point scale; from low to high. In addition, participants were asked to self-report their stress level during measurement; again on a 4-point scale from low to high. The brevity of these assessments of self-reported activity and social contact allowed for the least possible interference as participants went about their usual activity during the ABP study.

Procedure

Following completion of the laboratory study, participants were immediately invited to take part in the ambulatory study. The monitor was attached using the arm cuff which was placed on the participant's non-dominant arm. The hardware component was attached to a belt and participants were shown how to hide this under their clothing. Participants were instructed that the monitor would on average take a measurement once every twenty minutes. They were asked to keep their arm still during each measurement, but otherwise to continue with their normal daily activities. They were also asked to refrain from showering and from swimming for 24 hours, as this would damage the monitor. Prior to leaving the research laboratory, sample ABP measurements and activity diary recordings were taken in order to ensure all participants understood how to complete the diary. An appointment time for 24 hours later was confirmed for the return of the monitor and the activity diary.

Diary Data Reduction

The diary and ABP data were screened to determine that the measures co-occurred based on the self-reported diary time and the automated cardiovascular timestamp. Diary measures recorded within a timeframe of 10 minutes before or after the corresponding ABP timestamp were classified as accurate; diary ratings outside of these margins were deemed unreliable and deleted. This time window was selected to allow for some variation in (a) the time taken from cuff inflation to measurement recording, and (b) variation in time taken to complete the diary ratings. This screening resulted in a final sample of 374 sets of cardiovascular measures that co-occurred with diary data entry.

RESULTS: STUDY 2

Analytic Strategy

To account for the multilevel structure of the data (measures within persons), linear mixed models were conducted in SPSS Version 22 using maximum likelihood estimation. Ambulatory measures for SBP, DBP, and HR (Level 1) were nested within persons (Level 2). To determine if quality or quantity of social support was associated with ABP, each of these was entered as a fixed factor (i.e., at Level 2) in unadjusted models. As a time-varying confound of ABP, activity level was dummy-coded and entered at Level 1 (sitting, standing, and walking were contrasted with reclining) in adjusted models.

Social support and ambulatory blood pressure

Quality and Quantity of social support

Contrary to our hypothesis, the unadjusted models for SBP, DBP, and HR, revealed no significant associations between social support quality and ambulatory cardiovascular levels (all *p*s > .14). Similarly, the unadjusted models for SBP and DBP, revealed no significant associations between social support quantity and ambulatory cardiovascular levels (*p*s > .315). Finally, the unadjusted model for HR indicated that social support quantity was associated with elevated ambulatory HR (b = 0.01, S.E. = 0.003, df = 362, t = 2.67, p = .008), though the magnitude of the effect observed was small. This effect remained statistically significant in a model adjusted for activity level (b = 0.01, S.E. = 0.003, df = 344, t = 2.77, p = .006).

Social contact

Having established that neither quality nor quantity of perceived social support was associated with *reduced* ABP, follow-up analyses were conducted to determine if measures of social contact throughout the day were associated with ABP. The median level of social contact was 1.71 (range: 3.33 to 1.00). Social contact was added as a time-varying predictor at Level 1. In unadjusted models, social contact was not associated with ambulatory levels for SBP, DBP, or HR, and no association was observed when models were adjusted for activity level.

Social contact and stress

Finally, to determine if social contact was associated with reduced ambulatory levels during times of stress (i.e., to test for a stress-buffering effect), a final series of models was conducted for each outcome (SBP, DBP, and HR). The Level 1 predictors were social contact, stress, and the social contact × stress interaction effect - this model was estimated with and without control for activity level. No significant interaction effects indicative of a stress-buffering effect for social contact, were observed (all ps > .21).[1]

DISCUSSION

The present study offered a preliminary investigation of social support and CVR in the laboratory, as well as ABP in daily life, in the same sample of older adults. Consistent

[1] Although preliminary unadjusted analyses revealed main effects for stress on DBP and HR (such that increased stress was associated with elevated ambulatory levels), this effect was eliminated in models controlling for activity level.

with several studies examining broad measures of social support and health, psychometrically-assessed perceived social support was associated with attenuated SBP and DBP stress reactivity in the laboratory in older adults. However, contrary to our hypothesis, neither perceived quality of social support nor social contact during measurement was associated with attenuated ABP in everyday life; in fact, perceived social support operationalized as network size was associated with elevated ambulatory HR. This suggests that the stress-buffering effect of perceived social support observed in laboratory contexts may not extend to ambulatory cardiovascular function in everyday life in older adults. This study offers important directions for future research with older adults, a relatively understudied population in CVR research.

The findings are subject to a number of limitations that may offer guidance for future research. These include lack of information on marital status, depression diagnosis, and the relatively high proportion of participants on anti-hypertensive medications. Although the number of participants taking anti-hypertensive medications was in-line with expectations for older adult samples (Gu et al., 2012), these medications restrict the range of cardiovascular reactions leading to a more muted cardiovascular response to stress. As such, although social support showed a pattern of association with cardiovascular stress reactivity broadly consistent with established effects in other samples, replication studies that purposefully recruit a healthy older adult sample may clarify the stress-buffering potential of perceived social support for this group. In addition, particularly with studies examining social support in older adults, information on marital status and mental health diagnoses such as depression should be considered, though the challenges of controlling for appropriate covariates in psychobiological research should be acknowledged (Segerstrom, 2009).

BMI is another important potential confound of cardiovascular function and our sample had a mean BMI in the overweight range, with a few participants in the obese range.

Although ABP has similar longitudinal associations with cardiovascular events in obese and non-obese samples (Palatini et al., 2016), studies including participants across different BMI bands are important to adequately capture the impact of psychological variables on both CVR and ABP. Future research should recruit participants in the normal BMI range or alternatively, consider BMI as a predictor variable in multilevel analyses to adequately control for any potential moderating effects.

The restricted scope to control for time-varying confounds of ABP (in relation to [a] biobehavioural factors, such as posture and activity level and [b] social relationship factors), should be considered. Measures of ABP have been associated with several biobehavioural factors in other studies, such as eating, caffeine intake, body temperature, and so on. However, due to limited time at each ABP measurement, combined with the frequency of ABP measurement (every 20 minutes), only ratings of activity, stress, social contact, and mood were collected. In addition, these were collected using hard-copy only, thereby offering no possibility for independently confirming that diaries were completed at the time of measurement or were retrospectively completed. As such, there is much to improve in future research where electronic devices should be used to collect self-report data. In particular, it would be desirable for timestamps to be recorded in order to precisely match ABP measurement with self-report measurement. Of course, for samples where electronic devices may not be used frequently, comprehensive training may be required beforehand to ensure the participants are familiar with the devices in order to ensure their use does not impact negatively on their usual daily activities. This is particularly relevant when trying to capture momentary data outside the laboratory.

The single-item social contact measure as employed in this study was sufficient to indicate the level of social contact experienced over the course of a day. However, the measure lacks important detail such as the type of social interaction (e.g., in pairs or in a group), the nature of the tie the individual is in contact with (e.g., close friend or acquaintance), and the quality of the relationship with that tie. Recent work contends that not all social relationships are supportive, conflictual, or indifferent – relationships described as ambivalent are characterized by both positive and negative dimensions (Campo et al., 2009). Therefore, future research, particularly with older adult samples should attempt to measure daily social contact in greater detail than was achieved here, while simultaneously not disrupting the quality or quantity of participants' social interactions. Of course, it is likely that increased social contact would also be associated with increased talking; given that talking is associated with increased metabolic demand (e.g., Lynch, Long, Thomas, Malinow, & Katcher, 1981; Lynch, Thomas, Long, Malinow, & Katcher, 1982), future research should control for speech effects during social contact when measuring ABP in daily life.

The present study highlights challenges associated with ensuring participant compliance in ABP studies, particularly with older adult samples. Despite a deliberate effort to minimize participant burden, diary data were not completed for 11 participants. This may indicate that diary completion in ABP studies is relatively more burdensome for participants than the constraints associated with wearing an ABP monitor. In addition, several diary ratings were discarded since they were completed outside of the corresponding ABP measurement period, suggesting that concurrent completion of the activity diaries was somewhat challenging for the remaining participants. This is perhaps unsurprising, given participation in ABP protocols is usually intended to capture participants' activities on a typical day – these activities (and social interactions) are likely to be disrupted by frequent completion of activity diaries. Consideration of how best to ensure participant compliance, reliability of data, as well as acceptability of the protocol, is important for future research with similar groups.

In conclusion, the present findings suggest that perceived social support may be associated with reduced SBP and DBP reactivity to stress in the laboratory but not with reduced ABP, in older adults. However, these findings should be considered preliminary as methodological limitations prohibit firm conclusions. If replicated, however, the present findings lend partial support to the stress-buffering potential of social support in relation to acute psychological stress, extending this to a sample with qualitatively distinct social support networks and physiological stress profiles to younger samples. These findings highlight the importance of, and challenges associated with, examining both perceived social support and actual social contact in older adults.

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Table 1. Mean and *SD* SBP, DBP, and HR for each phase of the study as a function of high and low levels of perceived social support quality.

	Baseline				Task			
	Low Social Support		High Social Support		Low Social Support		High Social Support	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
SBP	138.67	16.93	145.96	20.41	159.81	22.75	162.73	21.06
DBP	79.98	11.70	76.19	10.44	87.62	15.04	82.27	12.29
HR	66.41	14.65	66.38	13.33	68.32	14.57	67.40	13.31